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MICROSCOPY.

Schaper's Method of Reconstruction.[1]—The ingenious method of reconstruction that has been described by Dr. Schaper has considerable advantage over the older method of Born, now long a familiar one in embryological laboratories. The base line of the sections is not at a distance from the section of the object as in the old method, but, on the contrary, is in the edge of the section itself, so that it is always in view, even where the section is so large as to be scarcely included within the field of vision. And one may as safely say that it is fully, if not more accurate than the older method.

Schaper first saturates the embryo with paraffin to prevent its drying and shrinking during the second stage of the process. In this second stage the embryo is taken from the bath and the superabundant melted paraffin removed from it by means of bibulous paper. It is then fastened by a drop of paraffin to a perfectly white piece of bristol-board. This forms a background from which the object stands out in sharp contrast, and allows of a good photograph being taken, or of an accurate outline sketch being made of it with a camera. The photograph or sketch is supposed to represent the natural size of the embryo.

The object is then removed from the bristol-board and replaced in the bath. Next he draws a line on the sketch or photograph just touching the dorsal outline and another one perpendicular to the first just touching the head, thus including the figure within a right angle. A similar right angle is drawn on a piece of cardboard that fits into the imbedding box. The latter is filled with melted paraffin, and then with warm needles the embryo quickly and carefully arranged in the right angle to correspond as closely as possible with the position of the figure in the sketch. The usual process of hardening the paraffin is then gone through and the object is ready for sectioning.

Care is taken in sectioning to have the plane of sectioning perfectly perpendicular to the median plane of the embryo; and, of course, it is assumed that the embryo is as straight as possible. The thickness of 20μ is chosen for the sections as the best, since in thinner ones the internal structures are apt to be broken and thicker ones are not likely to be sufficiently transparent. Sketches of the magnified sections are made on paper, and these, or whatever portion of them may be

[1] Schaper, A. (97). Zur Methodik der Plattenmodellirung. Zeit. Wiss. Mikros., XIII, 4, 446–59.

mounted, later transferred to wax sheets. But a pencil point is first made on the dorsal side of the sketch in the median plane, and sometimes also one in the same plane on the outline of the surface of some central organ, such, for instance, as the neural cord (*r* and *m*, figs. 1 and 2).

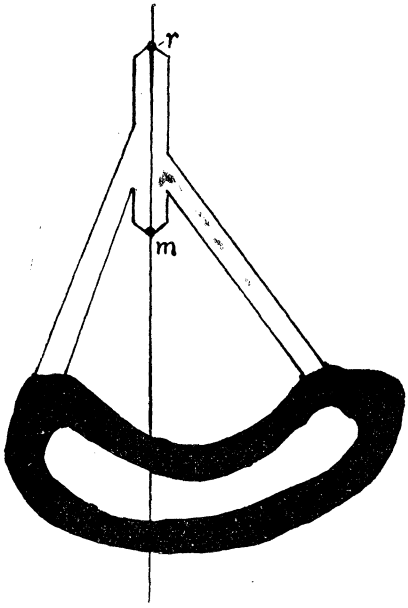

Fig. 1.

The photograph or sketch of the embryo is then enlarged upon a piece of bristol-board to correspond precisely with the magnification of the sections and the enlarged figure cut out with a sharp knife (fig. 2). If only an enlarged model of the entire embryo is desired, the remainder of the process is very short and simple. One has only to arrange the sections of wax representing the sections of the embryo within the bristol-board outline one after another and then smooth off outer surface with a warm modeling tool. If the sections are cut at right angles to the dorsal guide line of the right angle as well as to the median plane, the process will be easier to follow, for then the wax sections can be put in place with reference to this line. And if a model of only a portion of the embryo is desired, the proper place of the wax section in the bristol-board outline may be readily determined from the known thickness of the sections and the numbers in the series of the section with which the reconstruction is begun, by simply measuring off the proper distance on this dorsal guide line. For example, if the sections be 20μ thick, the magnification 100, the number of sections 100, and one desires to reconstruct the middle region of the embryo, beginning with the thirtieth section, the distance will be 20 x 30 x 100 or 60 mm.

If, as is usually the case, one desires a reconstruction of an internal organ, the process is somewhat more complicated. Then one will have need of the second guide point (*m*) already mentioned as on the surface of one of the principal or centrally located organs. In cutting out of

the wax plates the outlines of the sections of the organ to be reconstructed, this point, along with that on the dorsal surface, is cut out so

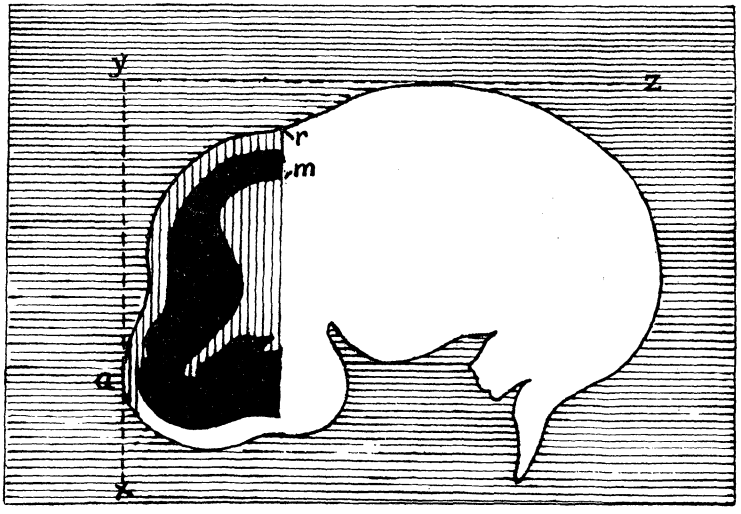

Fig. 2.

Fig. 2.—The Bristol-Board Guide. *x y z*, the dorsal and cephalic guide lines forming the right angle enclosing the figure of the embryo; *r*, the guide point in the dorsal surface and in the median plane; *m*, the guide point in the same plane on the lower surface of the neural cord.

as each to form a point of a piece of wax that remains connected with the sections of the organ by bridges of wax (fig. 1). When the series of wax sections have been cut out, they are then arranged in the bristol board guide in their proper places, care being taken that the two guide points fall within the plane of the bristol-board, and that the line passing through them is perpendicular to the dorsal line of 4–2 (fig. 2). When all are in place, nothing further, of course, remains than to smooth off the outer surface of model.—F. C. KENYON.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Torrey Botanical Club.—May 11, 1897.—Dr. N. L. Britton presided. Three new members were elected. Three successful excursions were reported. Resolutions were adopted commemorating Dr.